

## International Environmental Agreements

### I. The Kyoto Protocol (negotiated in Dec. 1997)

A. The most significant of the recent environmental treaties is the Kyoto Protocol (which is formally an addition to the Framework Convention on Climate Change negotiated in Rio in 1992).

- i. The substantive part of the treaties requires a subset of its signatories (essentially the developed countries, the “Annex I” countries) to take an inventory of human emissions of green house gases (Article 7) and establish a fund for promoting carbon reducing technologies in other countries (Article 11).
- ii. It also requires Annex 1 countries to prepare plans for “cost-effective national and, where appropriate, regional programmes to improve the quality of local emission factors, activity data and/or models which reflect the socio-economic conditions of each Party for the preparation and periodic updating of national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases.”
- iii. Kyoto also includes a provision for a carbon cap and trade systems (Article 17), in which developing countries can participate. (This allows developed countries to purchase carbon permits from developing countries.)
- iv. Annex B includes commitments by individual countries (developed Annex 1 countries) to reduce their emissions to below their 1990 emission levels, generally 6-8% below those levels by 2012.
- v. It is the latter which makes the treaty potentially the most substantive environmental treaty to date--because the environmental goals are by far the most expensive treaty to implement.

B. The treaty required 55 signatories to ratify the convention, including enough countries from Annex I to account for 55 percent of total emissions in 1990.

- Kyoto went into effect on February 16, 2005.
- Follow the link below for a list of ratifiers etc:  
[http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVII-7-a&chapter=27&lang=en](http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-a&chapter=27&lang=en)

C. The extent to which the signatories-ratifiers will actually meet their emissions targets cannot be known with certainty, but at this point it seems clear that few countries will achieve their targets through domestic legislation alone.

- i. (It bears noting that non-Annex I countries have been expanding CO<sub>2</sub> emissions faster than Annex I countries are reducing theirs.

- ii. Below are a estimates of CO<sub>2</sub> emissions from fossil fuel use in 1990 and 2006 for several of the largest emitters worldwide.
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  - Emissions in the China were approximately **2293** mmt in 1990 and **6017** mmt in 2006. [not an Annex I country]
  - Emissions in France were approximately **368** mmt in 1990 and **417** mmt in 2006.
  - Emissions in Germany were approximately **989** mmt in 1990 and **857** mmt in 2006.
  - Emissions in Italy were approximately **416** mmt in 1990 and **468** mmt in 2006.
  - Emissions in India were approximately **583** mmt in 1990 and **1293** mmt in 2006. [not an Annex I country]
  - Emissions in Japan were approximately **1053** mmt in 1990 and **1246** mmt in 2006.
  - Emissions in Russia were approximately **2056** mmt in 1992 and **1704** mmt in 2006
  - Emissions in the United Kingdom were approximately **604** mmt in 1990 and **585** mmt in 2006
  - Emissions in the US were approximately **5,028** mmt in 1990 and **5902** mmt in 2006. [not a ratifier]
  - (mmt = millions of metric tons)
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  - See (<http://www.eia.doe.gov/pub/international/iealf/tableh1co2.xls>)
  - (Both Germany and the U. K. lowered emissions by essentially closing down their coal industries, for reasons having little to do with Kyoto.)

D. Simply reducing greenhouse gas emissions will not end the human contribution to global warming, but it does reduce it relative to long term trends, which should **reduce the rate at which warming takes place** in the next century or two.

- i. The Inter governmental Panel on Climate Change, IPCC, notes that:
  - “The equilibrium **climate sensitivity** is a measure of the climate system response to sustained radiative forcing. It is **defined as** the equilibrium global average surface warming following a **doubling of CO<sub>2</sub>** concentration.
  - Progress since the [earlier reports] enables an assessment that **climate sensitivity is likely to be in the range of 2 to 4.5°C with a best estimate of about 3°C, and is very unlikely to be less than 1.5°C.**”
- ii. The latest complete report, a synthesis of climate research, is available at [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf)

## II. Four Phases of International Environmental Negotiations and Treaties

- A.** The economics-public choice rationalization for adopting environmental treaties is that there are “regulatory externalities” that can be “internalized” through Coasian contracts (if they can be self enforcing contracts).
- B.** The process of negotiating such Coasian contracts provides governments with a sequence of opportunities to sign both symbolic and procedural treaties en route to a substantive environmental agreement.
- i.** The process of addressing an international environmental problem begins with finding common interests in new environmental policies.
  - ii.** It ends with the joint implementation of those policies agreed to.
  - iii.** This often lengthy process, and normally the negotiations pass through four stages of development.
    - Each step is voluntary for sovereign nations.
    - So each step has to advance national (government) interests, in order to induce (a) participation in negotiations, (b) signing the agreement, (c) ratifying the agreement, and (d) implementing the agreement worked out at that step.
    - Sovereign nations can exit from negotiations and from treaties at essentially any time that they wish (e.g. that it serves the interest of the government of interest).
- C.** (i) The **first stage** requires agreement that mutual advantages from coordinating policies exist. Without agreement that mutual gains can be realized there is no point to further negotiation.
- D.** (ii) The **second stage** attempts to establish procedures by which alternative policy targets may be evaluated and chosen from. Without some process of collective decision making--especially in multilateral treaties--it will be difficult if not impossible to proceed to the third stage.
- E.** (iii) In the **third stage**, negotiators attempt to agree on specific environmental targets that can solve or at least ameliorate the environmental problem of interest. (iv)
- F.** **Finally**, after negotiators have agreed to effluent targets or specific regulations, each country must **pass and enforce new domestic environmental legislation** to meet its treaty obligations.
- G.** Congleton (1995) notes that after each of the **first three stages** of negotiation there is **an environmental treaty that can be signed**.
- i.** Treaties negotiated during the first stage may be categorized as symbolic treaties. *Symbolic* treaties do not characterize environmental regulations nor

targets, nor even procedures by which such substantive matters might be explored. They simply express sentiments about the prospects for better environmental policy. Agreements negotiated in the second stage may be categorized as procedural treaties.

- ii.** *Procedural* treaties develop institutions, often fairly rudimentary institutions, by which substantive matters regarding environmental targets or regulations may eventually be explored or developed. Such treaties build international institutions for collective decision making on specific environmental matters but do not explicitly proscribe environmental targets or regulations. (The actual text of procedural treaties often deals fairly extensively with institutional development, and nearly always includes text on matters very similar to those of symbolic treaties.)
  - iii.** Agreements negotiated in the third stage allow what might called substantive treaties to be signed. *Substantive* environmental treaties specify environmental targets or regulations to be implemented via new domestic legislation by all signatory nations. (Substantive treaties normally reflect their history, and contain lengthy symbolic and procedural sections as well.)
- H.** In order for environmental treaty negotiation to be initiated, the policy makers of at least two countries must believe that participation in the negotiation process yields net political advantages *for themselves*.
- i.** Participation does not necessarily imply that implementation of a properly drafted and coordinated set of environmental regulations will be beneficial for all of the governments participating.
  - ii.** Participation, itself, often generates domestic and international political advantage.
  - iii.** However, signing a substantive treaty implies that the government expects to benefit from the treaty signed--possibly by improving chances for winning the next election or by producing useful international good will that can be used in the future to advance the government's interests.

## III. Evidence Concerning the Pattern of Treaty Ratification and Implementation

- A.** Several papers have used statistical methods to determine whether the pattern of signatures on various multinational international environmental treaties can be explained as functions of such variables as national resource endowments, income, market structure, and political institutions as indicated above.
- B.** Fredriksson and Gaston (1999) analyze the time that it takes nations to sign and ratify environmental treaties. They focus on the United

Nations Framework Convention on Climate Change (FCCC) negotiated in New York and Rio De Janeiro in 1992.

C. The average time from signing the convention to ratifying it was 810 days.

- i. Fredrissson and Gaston find that the time a particular nation takes to ratify the treaty (once signed) can be explained with many of the same political and economic variables used in the Congleton and Murdoch and Sandler studies.
- ii. They found that nations with greater civil liberties and smaller CO2 emissions had a more rapid ratification of the FCCC than those with low civil liberties and high CO2 emissions in all their model specifications.
- iii. The estimated effects of other variables used to characterize national preferences for environmental policies were less robust.
- iv. National area and population, interpreted as proxies for national resource endowments, were found to be significant in several of their estimates.

D. Murdoch and Sandler (1997) estimate reductions in CFC using 1989 data. The data set, thus, is after the conclusion of the Montreal protocol (1986), but before the date at which signatories were obligated to reduce emissions (1993).

- i. They found that national reductions in CFC emissions are larger in high income states than in low income states, and that reductions in CFC emissions are greater in free countries (democracies) than in nonfree (dictatorships).
- ii. The latter results are consistent with the Congleton (1992) estimates of propensities dictatorships and democracies to engage in domestic regulation as proxied by their ratification of the international treaties regarding the control of CFC emissions.
- iii. However, Murdoch and Sandler note that the CFC treaties, themselves, appear to have done little to reduce CFC emissions. Only 38 of the 61 countries that reduced CFC emissions between 1986 and 1989 had ratified the Montreal Protocol. Nonratifiers were essentially as likely to have reduced emissions as ratifiers.

E. Rather, they argue, that observed reductions in CFC emissions were simply the voluntary provision of a public good rather than evidence of cooperative behavior. The CFC treaties appear to have ratified reductions that national policy makers were already prepared to make on the basis of their own independent self-interest.

F. The effect of international spillovers ("spill ins" and "spill outs") on propensities to sign international treaties and to adopt domestic legislation is examined in Murdoch, Sandler, and Sargent (1997). They analyze the impact of two substantive protocols to the Long Range Transboundary Air Pollution convention negotiated in 1979.

- i. The Helsinki protocol was negotiated in 1985 and required sulfur emissions to be reduced to 70% of 1987 emission rates by 1993.
- ii. The Sofia protocol was negotiated in 1988 and required reduction in nitrogen oxide emissions to 1987 rates by 1994.
- iii. Murdoch, Sandler, and Sargent estimate the effects that various national parameters have on emissions rates for the relevant effluents before and after the treaties were in effect.
  - Generally, they find greater reductions in national effluent emissions in countries where relatively more of domestic emissions fall within a nation's boundaries.
- iv. Reductions are smaller if national air quality is caused by the emissions of upwind countries.
  - They interpret these empirical results as evidence of strategic (Nash-like) behavior on the part of domestic policy makers.<sup>1</sup> Civil liberties again appear to affect the stringency of the regulations adopted.
- v. Perhaps the most interesting of their many empirical results is that the countries that signed the Helsinki and Sofia protocols are inclined to make larger reductions in domestic emissions than those that do not.
  - They interpret this pattern as evidence of a *screening effect* rather than of a treaty effect because the Sofia protocol *had not yet entered into force* at the time of their study.
  - That is to say, nations with smaller emissions are more inclined to sign international environmental treaties than those with larger emissions.

<sup>1</sup> The effect of wind direction on the propensities of nations to negotiate international agreements is also well illustrated by a case along the German French border analyzed by Feld, Pommerehne, and Hart (1996). In that case, money was raised in Klenbittersdorf, the downwind city, to upgrade a new incinerator in Grosbliederstroff, the upwind French town. Here wind direction not only determined the incentives for international negotiation but also the direction of monetary flows in the Coasian contract negotiated.

EC335: International Environmental Treaties

Major International Treaties				
Dates Negotiated, Number of Ratifiers, and Short Summary				
Treaty Name and Focus	Ratifying Countries (2008)	Year	Institutional Action	Substantive Goal/Obligations
Stockholm Action Plan for the Human Environment	UN	1972	Recommended UNEP	109 general and nonbinding recommendations
Convention on Prevention of Marine Pollution	57	1972		
MARPOL: Ship Pollution	63	1978		
Geneva Convention on Long-Range Transboundary Air Pollution	51	1979	Representative Executive Body	Exchange of information, consultation, research and monitoring, develop policies
Helsinki Protocol Concerning the Reduction of Sulfur Emissions	(Europe)	1985		Agree to reduce Sulfur emissions by 30% of 1980 levels by 1993
Vienna Convention on Protection of the Ozone Layer	194	1985		Promote research and monitor the ozone layer
Montreal Protocol on Substances that Deplete the Ozone Layer	194	1987		Requires nations to cut consumption of 8 substances to 50 % of 1986 levels
Sofia Protocol on the Control of Nitrogen Emissions	(Europe)	1988		Require reductions in NOx emissions to 1987 levels by 1994

Basel Convention on the Control of Movements of Hazardous Wastes	172	1989	Secretariat and Conference of the Parties	Requires notification by waste exporting countries and consent by waste importing countries
Rio: Framework Convention on Climate Change	176	1992	Secretariat and Conference of the Parties (COP)	Technology and information sharing, aim to reduce relevant emissions levels to 1990 levels
Kyoto Protocol to the Convention on Climate Change	184	1998	Secretariat and Conference of the Parties	Reduce emissions of green House gases (Generally to 6- 8% below 1990 levels by 2012.)
Stocholm Convetion on Persistant Organic Pollutants	163	2001		Agree to outlaw 9 of 12 persistent chemicals including several pesticides and DDT

UN treaties on the environment are available at:  
<http://treaties.un.org/Pages/Treaties.aspx?id=27&subid=A&lang=en>